

**MATCHING FUNDS REPORT  
CENTERS OF EXCELLENCE PROGRAM**

Lynn H. Blake, Ph.D.  
Director, Centers of  
Excellence Program  
31 August, 1987

## TABLE OF CONTENTS

Summary.....	3
Committments & Payments.....	5
Center for Biopolymers at Interfaces.....	7
Center for Controlled Chemical Delivery.....	8
Center for Engineering Design.....	9
Center for Advanced Combustion Engineering Research.....	10
Center for Computer Integrated Manufacturing.....	13
Center for Advanced Supercritical Fluid Separation Technologies.....	14
Center for Signal Processing Systems.....	15
Center for Computer Aided Design & Manufacturing.....	17
Center for Space Engineering Research.....	20
Center for Total Artificial Hearts & Biomedical Devices.....	21
Laser Institute.....	22
Center for Sensor Technology.....	23
Center for Aerospace Technology.....	24

## SUMMARY

### Contract Amount:

Center for Biopolymers at Interfaces.....	\$ 150,000
Center for Controlled Chemical Delivery.....	246,000
Center for Engineering Design.....	300,000
Center for Advanced Combustion Engineering Research.....	500,000
Center for Computer Integrated Manufacturing.....(sub-contract from USU)	
Center for Advanced Supercritical Fluid Separation.....	276,440
Center for Signal Processing Systems.....	250,000
Center for Computer Aided Design & Manufacturing.....	450,000
Center for Space Engineering Research.....	450,000
Center for Total Artificial Hearts & Biomedical Devices.....	125,000
Laser Institute.....	100,000
Center for Sensor Technology.....	75,000
Center for Aerospace Technology.....(sub-contract from USU)	
(Planning Grants)	
Center for Biotechnology.....	10,000
Center for Water Information Science & Control.....	10,000
Center for Advanced Fossil Fuel.....	15,000
Center for Advanced X-Ray.....	7,500
Center for Communications Research.....	10,000
Center for Microelectronics.....	10,000
Center for Non-Intrusive Diagnostic X-Ray.....	7,500
Center for Developing Utah's Heavy Oils Into Asphalt.....	10,000

TOTAL:.....\$ 3,002,440

### Total Matching Funds:

Center for Biopolymers at Interfaces.....	\$ 405,000
Center for Controlled Chemical Delivery.....	1,825,000
Center for Engineering Design.....	5,975,700
Center for Advanced Combustion Engineering Research.....	15,303,026
Center for Computer Integrated Manufacturing.....	150,155
Center for Advanced Supercritical Fluid Separation.....	1,636,892
Center for Signal Processing Systems.....	1,594,078
Center for Computer Aided Design & Manufacturing.....	4,174,932
Center for Space Engineering Research.....	321,795
Center for Total Artificial Hearts & Biomedical Devices.....	3,641,943
Laser Institute.....	2,183,000
Center for Sensor Technology.....	906,075
Center for Aerospace Technology.....	473,231

TOTAL: \$38,590,827

- New Companies Associated with Centers since beginning of their contract until June 30, 1987: 122
- Newly Created Spin-off Companies:

Baron Medical  
Salt Lake City, Utah  
President: Dr. Young Kwon  
Product: Medical devices  
Start-up date: 1 June, 1987  
# of employees: 12

Bioprocess Systems  
Salt Lake City, Utah  
President: Dr. Udipi R. Shettigar  
Product: Disposable blood filters  
Start-up date: 10 July, 1987  
# of employees: 3

Cardiac Research  
Salt Lake City, Utah  
President Dr. James McCrae  
Product: art. heart valves  
Start-up date: 1 April, 1987  
# of employees: 5

Smartware  
Provo, Utah  
President: Todd Moon  
Product: controllers for computers  
Start-up date: 1 January, 1987  
# of employees: 5

CAM Software Inc.  
Provo, Utah  
President: Howard Millett  
Product: software  
Start-up date: 10 July, 1987  
# of employees: 7

Cim Training Center (CTC)  
Provo, Utah  
President: Larry Shumway  
Product: manufacturing modules  
Start-up date: 1 January, 1987  
# of employees: 5

Digital Hearing Inc.  
Salt Lake City, Utah  
President: Dr. John Harrison  
Product: Artificial Ear  
Start-up date:  
# of employees:

- Relocated Company:

Intraspace  
North Salt Lake, Utah  
President: Robert D'Ausilio  
Product: Satellites  
# of employees: 500 (projected)

CENTER	COMMITMENT	PAID (AS OF JUNE 1987)	MATCH
Center for Biopolymers at Interfaces	\$ 150,000	\$ 20,000	\$ 405,000
Center for Controlled Chemical Delivery	246,000	26,668	1,825,000
Center for Engineering Design	300,000	28,571	5,975,700
Center for Advanced Combustion Engineering Research	500,000	500,000	15,303,026
Center for Computer Integrated Manufacturing (sub-contract)		-0-	150,155
Center for Advanced Supercritical Fluid Separation	276,440	29,323	1,636,892
Center for Signal Processing Systems	250,000	113,932	1,594,078
Center for Computer Aided Design & Manufacturing	450,000	19,855	4,174,932
Center for Space Engineering Research	450,000	183,349	321,795
Center for Total Artificial Hearts	125,000	-0-	3,641,943
Laser Institute	100,000	26,667	2,183,000
Center for Sensor Technology	75,000	15,000	906,075
Center for Aerospace Technology	(sub-contract)	-0-	473,231
TOTAL	\$3,002,440	\$963,365	\$38,590,827

Ratio of Match Committed to Contract Dollars Paid: 40 to 1

<b>Planning Grants</b>		
Center for Biotechnology	10,000	10,000
Center for Water Information Science & Control	10,000	10,000
Center for Advanced Fossil Fuel	15,000	15,000
Center for Advanced X-Ray	7,500	-0-
Center for Communications Research	10,000	10,000
Center for Microelectronics	10,000	10,000
Center for Non-Intrusive Diagnostic X-Ray	7,500	-0-
Center for Developing Utah's Heavy Oils to Asphalt	10,000	10,000
<b>TOTAL</b>	<b>\$ 80,000</b>	<b>\$ 65,000</b>
<b>Special Project: AF/RAMP Administration</b>		
	FY 86-87	128,000
	FY 85-86	64,409
	FY 86-87	140,000
<b>TOTAL</b>		<b>\$ 332,409</b>
<b>Ratio of Match Committed to Total Program Expenditures: 53 to 1</b> (Contracts, Planning Grants, Special Projects & Admin.)		
<b>Appropriations</b>		
	FY 85-86	\$2,500,000
	FY 86-87	992,500
<b>TOTAL</b>		<b>\$3,492,500</b>
<b>Ratio of Match Committed to Total Program Appropriations: 11 to 1</b>		

Center for Biopolymers at Interfaces  
Karin D. Caldwell, University of Utah

Contract Amount: \$75,000

The main focus is to develop a through understanding of interfacial interactions essential for the control of processes and the design of products in many areas of industry including food processing, medical devices, scientific instruments, pharmaceuticals, cosmetics, soaps and detergents, sensors and controls, coatings, and many areas of biotechnology.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Bausch & Lomb		\$ 45,000
Becton-Dickinson		45,000
Ciba-Geigy		45,000
DuPont Biomed		45,000
Eastman Kodak		45,000
Eli Lilly		45,000
Johnson & Johnson		45,000
Proctor & Gamble		45,000
Travenol Lab.		<u>45,000</u>

TOTAL \$405,000

Companies Associated Since Contract (8)

Bausch & Lomb  
Becton-Dickinson  
Ciba-Geigy Corp.  
DuPont Biomedical Products  
Eastman Kodak Co.  
Eli Lilly & Co.  
Proctor & Gamble  
Travelol Laboratories

In-State Associations:

Symbion, Inc.

Out-of-State Associations:

Bausch & Lomb  
Becton-Dickinson  
Ciba-Geigy Corp.  
DuPont Biomed. Prod.  
Eastman Kodak Co.  
Eli Lilly & Co.  
Johnson & Johnson  
Proctor & Gamble Co.  
Travenol Laboratories

Center for Controlled Chemical Delivery  
Sung Wan Kim, University of Utah

Contract Amount: \$100,000

The main focus is to develop new and effective methods for the delivery of pharmaceutical and chemical agents.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Theratech Inc.		\$ 600,000
Ciba-Geigy		1,200,000
Hisamitsu		15,000
Sam Yang Co.		<u>10,000</u>
	TOTAL	\$1,825,000

Companies Associated Since Contract (5)

Theratech Inc.  
Research Medical Inc.  
Ciba-Geigy  
Baron Technologies  
Pfiser

In-State Industrial Associations:

Biomaterials International Inc.  
Therapeutics Technologies Inc.  
Theratech Inc.  
Research Medical Inc.

Out-of-State Associations:

Ciba-Geigy  
Pfiser  
Hisamitsu  
Sam Yang Co.



Center for Engineering Design  
Stephen C. Jacobsen, University of Utah

Contract Amount: \$300,000

The main focus is on projects including artificial limbs, drug delivery systems, physiological signal monitors, artificial kidneys, robots and microelectro-mechanical systems.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
DARPA		\$5,000,000
Sarcos		290,000
Sarcos		93,700
Sarcos		430,000
NCI		<u>162,000</u>
	TOTAL	\$5,975,700

Companies Associated Since Contract (10)

Walt Disney Imagineering  
Sarcos  
Motion Control  
JMW Acquisitions  
Bell Laboratories  
NASA  
Wright Patterson Air Force Base  
New York University  
Merck  
Rockwell

In-State Industrial Associations:

Animate Systems Inc.  
Darpa Inc.  
MFD (Microfield Devices)  
Motion Control Inc.  
Sarcos Inc.

Out-of State Associations:

Walt Disney Imagineering  
JMW Acquisitions  
Bell Laboratories  
NASA  
Wright Patterson Air Force Base  
New York University  
Merck  
Rockwell

Center for Advanced Combustion Engineering Research  
L. Douglas Smoot, Brigham Young University

Contract Amount: \$500,000

The main focus is on development of new combustion technology that will improve the U.S. competitive position in the international market, with an emphasis toward the clean and efficient use of low-grade fossil fuels, particularly coal.

Matchings Funds:

<u>Source</u>	<u>In-Kind</u>	<u>Cash</u>
Advanced Fuel Research Inc.		\$2,000,000
Air Force		150,000
Angus Chemical		30,435
Babcock and Wilcox		49,678
Chevron Research		25,000
Combustion Engineering Inc.		65,000
Consolidation Coal		65,000
Convex Computer Corp.		75,000
Coordinating Research Council		40,000
Corning Glass Works		25,000
Dow Chemical USA		25,000
Electric Power Research Institute		132,429
Empire State Electric Energy		331,040
EPA		274,314
Foster Wheeler Corp.		49,678
Gas Research Institute		75,000
Gas Research Institute (second contract)		238,150
General Electric Corp.		25,000
General Motors Corp.		25,000
Idaho National Engineering Lab.		25,000
Los Alamos National Laboratory		62,294
Morgantown Energy Technology Center		1,041,432
National Institute of Health		127,186
National Science Foundation		9,700,000
National Science Foundation (Grant #2)		77,219
Pittsburgh Energy Technology Center		165,537
Pratt & Whitney		23,503
Pyropower Corporation		25,000
Questar Corp.		25,000
Shell Development		25,000
Southern California Edison Co.		25,000
Tennessee Valley Authority		82,769
TRW		25,000
Utah Power and Light Authority		<u>172,362</u>

TOTAL \$15,303,026

Companies Associated Since Contract (14)

Convex Computer Corp.  
Gas Research Institute  
General Electric Corp.  
Chevron Research  
Corning Glass Works  
Dow Chemical USA  
Idaho National Engineering Lab.  
General Motors Corp.  
Pyropower Corp.  
Questar Corp.  
Shell Development  
Southern California Edison Co.  
TRW Inc.  
Los Alamos National Laboratory

In-State Industrial Associations:

Combustion Lab  
Eyring Research Institute  
Hercules Inc.  
Questar Development  
Utah Power & Light

Out-of-State Associations:

Advanced Fuel Research Inc.  
Allison Gas Turbine  
ANL  
Babcock and Wilcox  
Battelle Memorial Institute  
Bertin and Cie (France)  
British Gas Corp.  
Chevron Research Co.  
Coen Company  
Combustion Engineering Inc.  
Conoco Coal & Chemicals Co.  
Convex Computer Corp.  
Corning Glass Works  
DOE/METC  
DOE/PETC  
Dow Chemical USA  
Electric Power Research Institute  
Empire State Electric Energy  
Energiteknisk Utveckling (Sweden)  
EPRI  
EVT  
Exxon  
Eyring Research Institute  
Foster Wheeler Corp.

Gas Research Institute  
General Electric Co.  
Harwell  
Hercules  
Hitachi America Ltd.  
IHI Heavy Industries  
IRSID  
Kaiser Coal Corp.  
Kobe Steel (Japan)  
Laboratoires du Cherchar (France)  
LANL  
Los Alamos National Laboratory  
MIT  
Mt. Energy Resources  
Morgantown Energy Technology Center  
NASA  
NRRI  
Nuclear Technical Services  
Phillips Petroleum Co.  
Pittsburgh Energy Technology Center  
Questar Development Corp.  
Research Institute (Sweden)  
Rockwell International  
Sandia National Laboratories  
Shell Development  
Southern California Edison Company  
Standard Oil  
Tennessee Valley Authority  
Utah Power and Light  
Wayne State University

Center for Computer Integrated Manufacturing  
Dell K. Allen, Brigham Young University

(Sub-Contract from Utah State  
Univ. in the amt. of \$132,000)

The main focus is on development and application of software, hardware, and courseware, required for manufacturing systems integration; including software for variant and generative process planning, knowledge-based systems, electronic component selection and a shop-floor data collection system.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Hewlett Packard		15,000
DCLASS Software Royalties		9,600
Avco Lycoming		<u>125,555</u>
	TOTAL	\$150,155

Companies Associated Since Contract (4)

Hewlett Packard  
Avco Lycoming  
Reliance Electric  
Autodesk Inc.

In-State Industrial Associations:

Boeing  
Cam Software Inc.\*  
Caterpillar  
Cessna Aircraft  
Clark Equipment  
CTC\*  
Digital and Management Technologies Inc.  
EchoSystems  
E-Soft  
Evans & Sutherland Corp.  
Morton-Thiokol  
MTI  
Rayethon  
Smartware\*  
Tolman Engineering  
UNISYS  
Valtek  
VidComp  
Westinghouse  
Xerox Corporation

Out-of-State associations:

Autodesk Inc.  
AVCO-Lycoming  
Stanley Vidmar  
Reliance Electric

Center for Advanced Supercritical Fluid  
Separation Technologies  
Milton L. Lee, Brigham Young University

Contract Amount: 150,000

The main focus is on research in three main areas: capillary column supercritical fluid chromatography, supercritical fluid extraction and fractionation for analytical purposes, and determination of the thermodynamic properties of supercritical fluids.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
DOE- Identify Genotoxic Components		\$ 443,906
DOE- Supersonic Jet Spectroscopy		174,986
DOE- Mass Spectrometry		279,000
Gas Research Institute		300,000
Coordinating Research Council		40,000
Dow Chemical		8,000
Exxon Educational Foundation		8,000
Shell Development Co.		20,000
DOE		133,000
Gas Research Institute		150,000
NSF Adv. Combustion Eng.		<u>80,000</u>

TOTAL \$1,636,892

Companies Associated Since Contract (4)

Shell Development Co.  
Dow Chemical  
Exxon Research & Engineering  
Monsanto

In-State Industrial Associations:

Chevron  
Lee Scientific.  
Union Carbide

Out-of-State Associations:

Gas Research Institute (Chicago, IL)  
Dow Chemical  
Exxon Research & Engineering  
National Science Foundation  
Department of Energy  
Shell Development Co.  
Monsanto

Contract Amount: 250,000

**Matchings Funds:**

TOTAL	\$1,594,078
-------	-------------

Hewlett Packard  
Westinghouse  
UNISYS  
Tektronix  
Hughes  
Office of Naval Research  
Federal Bureau of Investigation  
Digital Hearing  
Antin  
Excalibur

In-State Industrial Associations:

Digital Hearing Inc.\*.

ESL (SLC)

Eyring Research Institute

Excalibur Electronics

Gould/AMI Inc.

Icon

Signetics

TRW ESL Utah Software Office

UNISYS

Westinghouse

Wicat

Out-of-State Associations:

Hewlett Packard

Tektronix

Netline

Antin/CAECO



The main focus is research in computerized drafting, 3-D design, solid modeling, finite element modeling, numerical controlled manufacturing, robotics, facilities management, plant monitoring and control, data base management and inventory planning.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Structural Dynamics Co.		\$ 252,000
Dassault Systems Co.		219,000
Lockheed Co.		123,000
Thiokol		75,000
Mac-Neal Schwendler		72,000
IBM		<u>3,433,932</u>
	TOTAL	\$4,174,932

Companies Associated Since Contract (18)

Psomas R. Associates  
Yampa Valley Coal Corp.  
ELC Electron Consulting Spa (Italy)  
Alca Engineers  
Pyramid Engineering  
B&A Engineering Inc.  
Raymond Vail & Assoc.  
Central Utah Water Conservancy District  
Jones & Associates  
Hercules Inc.  
Engineering Dept. of Bountiful, Utah  
Dept. of Natural Resources, Div. of Water Resources  
Getty Mining Co.  
Weber Basin Water Conservation  
Emery Mining  
Caldwell Richard & Swensen  
Atascadero Mutual Water Co.  
W.E. Quicksell & Assoc. Inc.

In-State Associations:

Autonetics Strategic Systems Division  
Caldwell Richards & Sorenson,  
Central Utah Water Conservancy Dist.  
Dept. of Natural Resources Division of Water Res.  
Eimco Process Equipment Co.  
Emery Mining Corp

Evans & Sutherland  
Ford Bacon & Davis Engineers  
Fram Autolight  
Getty Mining Company  
Hercules Inc.  
Jones & Associates  
Morton-Thiokol Inc.  
Northwest Pipeline Corp  
OmniData International  
Rockwell International  
TRW Ballistic Missiles  
Utah Power & Light  
Weber Basin Water Conservancy

Out-of-State Associations:

Structural Dynamics Co.  
Dassault Systems Co.  
Lockheed Co.  
Mac-Neal Schwendler  
Atascadero Mutual Water Co.  
ELC-ELECTRONCONSULT  
W.E. Quicksall & Assoc.  
B. & A. Engineers, Inc.  
Fars Regional Authority  
Sierra Pacific Power Co.  
Gingery Engineering Co.  
UMA-Engineering Unlimited  
KKBNA Engineers, Inc.  
Howard Godat & Assoc. Inc.  
Marbury Engineering Co.  
Aktiengesellschaft  
Boeing Computer Services  
Oregon Institute of Technology  
USAID/EQUADOR  
City of Jacksonville, Fla.  
Board of Public Utilities of Casper Wyoming  
Office National de l'eau Potable in Morocco  
EMC Engineering Co.  
SAINCO  
Universal Engineering Co.  
Pyramid Engineers & Land Surveyors  
J-U-B- Engineers Inc.  
Center for Mgmt Utilities & Protection - Cookeville, TN  
TRACOR Applied Sciences Inc.  
Forsgren-Perkins Engineering  
TRACOR Hydronautics Inc.  
West Natn'l Tech. Ctr. (Portland OR)  
SYMCAS, Inc.

Troltz King Durall Anderson & Assoc.  
Costin Engineering Co.  
FLOOD Engineers  
Macolom-Pirnjie Consulting Engineers  
Bohannon-Huston Inc.  
Katholieke Univ. (Belgium)  
Willdan Assoc.  
ADEM Ingenieurs Consells (Belgium)  
Eduardo Ribeiro de Souse (Portugal)  
Roen Design Assoc.  
Ford Engineering  
CH2M-Hill  
Wiley & Wilson  
PRC Toups. Div. of PRC Engineering  
AMAX Coal Co.  
VTM Consolidated Inc.  
FEMA  
TUV  
Goodyear Atomic Corp.  
E.I. DuPont DeNemours & Co.  
Robert C. Bogart & Assoc.  
City of Lafayette, LA  
PETRO Canada Exploration Inc.  
Montgomery Engineers  
CE-DATA A/S Byggeteknisk (Denmark)  
UN PROYECTO CONACYT CIQA (Mexico)  
Merrick & Co.  
Holmes & Marver Inc.  
Banner & Assoc.  
East Bay Municipal Utility, Oakland, CA  
Pacific Power & Light of Portland  
Psomas R. Associate  
Yampa Valley Coal Corp.  
ELC Electron Consult Spa  
Alca Engineers  
Pyramid Engineering  
Raymond Vail & Assoc.

Center for Space Engineering Research  
Frank J. Redd, Utah State University

Contract Amount: \$475,000

The main focus is to bring University Space Engineering resources to bear on the support of locally based space enterprises, encourage innovative research leading to spinoffs of new industry, attract new space industry to Utah, and produce experienced graduates ready to join an expanding state employment base in space industries.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Globesat Inc.		\$ 200,000
UNISYS		30,970
Space Systems Engineering		12,705
Morton-Thiokol		58,060
Learn Inc.		14,060
Fibertek		<u>6,000</u>
	TOTAL	\$321,795

Companies Associated Since Contract (6)

Globesat Inc.  
UNISYS  
Space Systems Engineering  
Morton-Thiokol  
Learn Inc.  
Fibertek

In-State Industrial Associations:

Globesat  
Eyring Research Institute Inc.  
E-Systems Inc.  
Learn Inc.  
Morton-Thiokol  
Northwest Pipeline Corporation.  
Space Systems Engineering  
UNISYS

Out-of-State Associations:

American Rocket Company  
Boeing Aerospace

Center for Total Artificial Hearts &  
Biomedical Devices

Donald B. Olsen, University of Utah

Contract Amount: \$125,000

The main focus is on the development of artificial organs such as the heart and monitoring and diagnostic devices, artificial fallopian tube, urinary bladder, urethra, sphincter and ureter.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Symbion surgical training		\$ 888,287
Dr. Kwon (electromechanical heart)		70,000
NIH Grant- Immune -Response Changes		248,261
NIH Grant- Small Art. Heart		1,089,457
NIH Grant- Arterial Peptide		600,000
NIH Grant- Utah 100		103,287
NIH Grant- UCLA		140,810
NIH Grant- LVAD		100,781
NIH Grant- Platelet		288,060
Temple University		50,000
Nimbus		30,000
Technical Research Assoc.		500
VA Hospital		25,000
Catheter Technologies		<u>7,500</u>

TOTAL \$3,641,943

Companies Associated Since Contract (4)

Cardac Systems  
Nimbus  
Technical Research Assoc.  
Catheter Technologies

In-State Associations:

Baron Technologies\*  
Catheter Technology  
Deseret Pharmaceuticals  
Symbion

Out-of-State Associations:

Lexco  
Cardiac Systems\*

Laser Institute  
John A. Dixon, University of Utah

Contract Amount: \$100,000

The main focus is the development of cardiac surgical laser devices, drugs (photosensitizers), fluorescence sensors, laser fibers and laser power sources in the photodynamic therapy of cancer, and multiple wavelength treatment capabilities for laser surgery.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
Phaser-R Corp.		\$ 35,000
Cooper LaserSonics		70,000
Treadwell Foundation		35,000
Virginia Zambukas Estate		43,000
Office of Naval Research- Lasers in Biomedical Application		1,200,000
Office of Naval Research- Lasers in High Energy		<u>800,000</u>
	TOTAL	\$ 2,183,000

Companies Associated Since Contract (12)

Pfizer Hospital Products  
Luxtron  
3M  
HGM Medical Lasers  
Cooper Lasersonics  
Xanar  
R. Wolfe  
Olympus Corp. of America  
SLT  
Lasers for Medicine  
Eder Instruments  
Treadwell Foundation

In-state Associations:

HGM Medical Laser Systems

Out-of-State Associations:

Pfizer  
Luxtron  
3-M Corp.  
Cooper Lasersonics  
Xanar  
R. Wolfe  
Olympus Corp. of America  
SLT  
Lasers for Medicine  
Eder Instruments  
Treadwell Foundation

Center for Sensor Technology  
Jiri Janata, University of Utah

Contract Amount: \$75,000

The main focus is on integration of solid state electronics, chemistry, physics and biology and investigation and application of the physiological and biochemical principles of sensing.

Matchings Funds:

<u>Source</u>	In-Kind	Cash
NIH- Remote Monitoring of Proteins		\$ 281,016
Office of Naval Research		285,879
Whitaker Foundation		143,977
NIHR		<u>195,203</u>
	TOTAL	\$906,075

Companies Associated Since Contract (7)

Baxter Travenol  
Boehringer Mannheim  
Ciba-Corning  
Eli Lilly  
I.C. Sensors  
Sorin Biomedica (Italy)  
Unilever

In-State Associations:

Sorenson Research

Out-of-State Associations:

National Institute of Health  
Office of Naval Research  
Whitaker Foundation  
NIHR  
Baxter Travenol  
Boehringer Mannheim  
Ciba-Corning  
Eli Lilly  
I.C. Sensors  
Sorin Biomedica (Italy)  
Unilever

Center for Aerospace Technology  
Robert J. Twiggs, Weber State College

(Sub-Contract with USU in the  
amount of \$125,000)

The main focus is to design and manufacture useful aero-space experiments, devices or systems, and to support similar enterprises in space industries and in other Utah schools and organizations.

Matchings Funds:

<u>Source</u>	<u>In-Kind</u>	<u>Cash</u>
ADS, INC.	100	
Affiliate Metals	\$ 1,091	
American Cyanamid	100	
Browning Manufacturing		\$ 125
Bonneville Scientific		\$ 4,700
Deutsch Fastener Corp.	170	
Federal Aviation Association		\$ 24,000
Federal Aviation Association		800
Federal Aviation Association		14,000
Hexel Corp.	500	
Hill Air Force Base	\$ 15,000	
Lundahl Astro Circuits		3,500
Microtech Research Inc.	850	
Narmco Materials	100	
Nuelink Inc.	68	
Peterson Specialized Fabricators	475	
Pensar Inc.		1,240
Spectro Labs	3,600	
Stanley Tools	75	
TRW	470	
In-kind hours (WSC & Companies)	<u>402,267</u>	
(this figure documented with a de- tailed breakdown on file)	424,866	<u>48,365</u>
TOTAL	\$473,231	

Companies Associated Since Contract (22)

Stanford Telecommunications Inc.  
Intraspace  
Orion International Technical  
RMS Technical Inc.  
Niagara Mohawk Power  
TRW  
Ballalis  
QSI Systems  
Federal Aviation Association  
Computer Science Corporation



Bonneville Scientific  
Eagle Canyon Research Association  
Toomay Mathis & Associates  
Ogden City Development  
Richland Community College  
EGNGG  
Globesat  
Lundahl Astrocircuits  
Leopete Technologies  
Morton-Thiokol  
Rockwell International  
Pensar  
Browning Arms

In-State Industrial Associations:

Bonneville International Corp.  
Browning Manufacturing  
Computer Sciences Corporation  
Defense Systems Inc.  
Globesat  
Intraspace Inc.\*\*  
McDonald Douglas.  
Morton-Thiokol Corp.  
Rockwell International Inc.  
TRW Aircraft Systems Group  
Union Pacific  
UNISYS

Out-of-State Associations:

Intraspace Inc.  
Space Systems Inc.  
Orion  
RMS Technologies  
Niagra Mohawk  
Amateur Sat. Group  
Richland Comm. Col. Deacatur  
Federal Aviation Association

\* Newly created companies

\*\* Relocated companies